3983-05 May 1992

MEASURING GROWTH IN THE VOLUME AND INTENSITY OF MEDICARE PHYSICIAN SERVICES: 1985-1989

Stephen Zuckerman
John Holahan

Federal Project Officer: Sherry Terrell

Support for this research was provided by the Health Care Financing Administration to The Urban Institute through cooperative Agreement No. 17-C-99473/3-01. This cooperative agreement supported a number of research projects related to the Medicare Volume Performance Standard Policy. The total budget for all of these projects was $449,419 and represents the sole source of funding. Opinions expressed in this document are those of the authors and do not necessarily represent the views of The Health Care Financing Administration, The Urban Institute or its sponsors.

Table of Contents

INTRODUCTION 1

METHODS AND DATA 3

RESULTS 9

Type of Service 11

Specialty 14

Geographic Areas 20

CONCLUSION 25

REFERENCES 27

List of Tables

Table 1 Decomposition of Growth in Medicare Allowed Charges 1985-1989, by Type of Service 10

Table 2 Annual Growth in Volume and Intensity of Medicare Physician Services, 1985-1989 by Type of Service 13

Table 3 Decomposition of Growth in Medicare Allowed Charges 1985-1989, by Type of Service 15

Table 4 Relationship between Changes in Price (P) and Volume and Intensity (VI) for Specialties Most Affected by OBRA 1987 Overvalued Procedure Payment Reductions 16

Table 5 Annual Growth in Volume and Intensity of Medicare Physician Services 1985-1989, by Specialty 19

Table 6 Decomposition of Growth in Medicare Allowed Charges 1985-1989, by Area Type 21

Table 7 Decomposition of Growth in Medicare Allowed Charges 1985-1989, by Area 22

Exhibit A Designations of Medicare Payment Localities 7

INTRODUCTION

Medicare physician spending has been growing at an annual rate exceeding 10 percent for the past decade. A small share of this is due to the inevitable growth in the numbers of beneficiaries, but the remainder is due to increases in both fees and the numbers and mix of services (often termed "volume and intensity"). Policies to slow the growth in fees have been implemented. However, there is a clear consensus emerging that spending will not be controlled until there is a reduction in the rate of growth in the volume and intensity of services. A study by the Congressional Research Service [CRS] (Cahill et al., 1989) shows that 44 percent of the growth in spending per beneficiary between 1980 and 1986 was due to volume and intensity. Moreover between 1985 and 1986 -- a period of slow fee growth during a fee freeze -- volume and intensity accounted for over 61 percent of the growth in spending per beneficiary. This type of information led Congress to adopt an explicit volume policy -- Medicare Volume Performance Standards (MVPS) -- at the same time it enacted a new fee schedule for Medicare services (OBRA 1989 [PL100-239]). Under MVPS, if Medicare physician spending exceeds some pre-established rate of growth, fee updates may be constrained to an extent directly related to the excess spending growth. Alternatively, if spending growth falls below the standard, MVPS may reward physicians with fee updates in excess of the MEI.

While spending growth varies by type of service and specialty (Berenson and Holahan, 1990; Holahan and Berenson 1991), the initial MVPS policy was enacted with a single national standard. Subsequently, separate standards have been established for surgical and non-surgical

services, with the possibility that fee updates could vary by these broad types of services.[1] A major criticism of this policy is that it attempts to control spending at such an aggregate level that individual physicians have little incentive to change their behavior and control volume. In addition, since spending growth varies across types of services it may not be appropriate to implicitly make fee updates for all services a function of volume growth that may be driven by a few types of services. Some refinements of this policy may be considered.

However, before refinement takes place policymakers should have a clear picture of the causes of the overall growth in Medicare physician spending. In recent years, does volume and intensity growth continue to be important? If volume and intensity growth is a key factor, is this growth limited to relatively few types of services, specialties, or areas? Using data from the 1985 through 1989 Medicare Part B Annual Data (BMAD), we decompose the growth in spending into those shares due to growth in beneficiaries, Medicare allowed prices, and volume and intensity. This decomposition is presented by type of service, specialty, and type of geographic area. Variations in historical patterns of changes in prices and volume and intensity across all of these categories may be substantial and could be taken into account in any reconsideration of the present MVPS structure.

This study represents a methodological innovation in the measurement of price and volume and intensity growth. The CRS study used an index of prices to deflate expenditures that

1. The following table shows the MVPS rates for the first three years the policy was in effect:

	Medicare Volume Performance Standard		
Year	All Services	Surgery	Non-Surgery
1990	9.1%	9.1%	9.1%
1991	7.3	3.3	8.6
1992	10.0	6.5	11.2

was based on a fixed basket of services within each procedure group they considered. This does not allow for the fact that the relative importance of services change over time, sometimes substantially. Perhaps more importantly, the CRS approach did not allow the price measure to include prices from newly introduced services. This caused all changes in the mix of services to be reflected in their measure of volume and intensity, the "net residual." This could have led to a overstatement in volume and intensity growth if the newer services tend to be more expensive than those included in their index of price. However, since their study covered only a three-year period the impact of not including new procedures may not have been severe. But the period covered by an analysis of this type lengthens, the failure to capture new services in the price index increases the chance of meaningful distortions in the results. Therefore, we apply a price index approach that accommodates the fact that both the relative importance of individual services and their mix change over time.

METHODS AND DATA

The basic identity showing the relationship between expenditures, beneficiaries, prices and volume and intensity can be written algebraically as:

$$(1) \quad E_t = B_t * P_t * VI_t$$

where t refers to the year; E = Medicare allowed charges (total or by type of service, specialty, or geographic area); B = Medicare beneficiaries; P = average allowed charge; and VI = volume and intensity of services. Therefore, the growth from year t to t+1 is the ratio of E_{t+1} to E_t or:

$$(2) \quad E_{t+1}/E_t = (B_{t+1}/B_t) * (P_{t+1}/P_t) * (VI_{t+1}/VI_t).$$

Volume and intensity (VI) cannot be measured directly. As in other studies (e.g., Barer et al., 1988), we compute the rate of growth in VI as the residual growth in expenditures after netting out the growth in beneficiaries and prices. Since the expression shows that the annual growth in

expenditures is equal to the product of the annual growth in beneficiaries, prices, and volume and intensity, it follows that the growth in VI is equal to the growth in expenditures divided by the product of the growth in enrollees and the growth in prices.

During the 1985 to 1989 period covered by this study, we observe four annual changes in expenditures, beneficiaries, and prices such as those conveyed in equation 2. To ensure that our results are not dominated by any single year, we use the average annual rate of growth in the decomposition. Given the four annual changes, we can compute total growth in any of these variables as the product of the component annual growth rates. This implies that the total growth in, say, expenditures can be written as:

$$(3) \qquad E_{89}/E_{85} = E_{86}/E_{85} * E_{87}/E_{86} * E_{88}/E_{87} * E_{89}/E_{88}.$$

This relation suggests that the average annual growth rate over this period should be computed as the geometric mean of the annual growth rates, as opposed to the arithmetic mean. The average annual growth rates in expenditures, beneficiaries, and prices are used as the basis for computing VI growth over this period. VI growth is computed for all services and by type of service, specialty, and geographic area.

Data on expenditures, prices, and beneficiaries are required to conduct this study. The 1985 through 1989 BMAD Procedure Files are the primary data sources for Medicare physician expenditures (allowed charges) and individual service volumes. In any year, the Medicare price for a particular service is measured as the average allowed charge -- the ratio of total allowed charges for each service to the number of services. The analysis files have been constructed so that expenditures and prices can be tracked at the national level as well as for individual geographic areas.

Information on enrollee changes were drawn from the corresponding Medicare Denominator Files. These files were constructed by the Health Care Financing Administration (HCFA) in order to provide a consistent source of data on beneficiary counts so that expenditures or service counts could be expressed on a "per beneficiary" basis without need to rely on more fundamental sources of data, e.g., Health Insurance Skeleton Eligibility Write-Off (HISKEW) file. Beneficiaries enrolled in risk contract HMOs are excluded from the analysis.

The measurement of the price change in equation 2 requires additional discussion. As written, P_{t+1}/P_t represents the change in the average allowed charge for a Medicare physician service. Since this information is not contained in the price for any individual service, it is necessary to develop a basket of services that can be used in an index of price change. A detailed discussion of the exact type of price index that is used is presented elsewhere (Zuckerman and Holahan, 1991). The fundamental objective is to create a price index that acknowledges both that the relative importance of individual services (index weights) change over time and that new services are frequently introduced into the market. Common fixed-weight indices such as Laspeyres or Paasche do not allow for changes in a procedure's importance and tend to lead to distortions in the measurement of price change through "substitution bias" over the long run. In the case of a Laspeyres index the "bias" arises from not acknowledging that physician services that are growing in importance generally have higher prices than those that are declining.

To address this problem, we compute price changes using a Fisher's Ideal price index -- the geometric mean of a Laspeyres and Paasche price Index -- that allows the relative importance of services to differ at the beginning and end of the period. If the growth in high-price services exceeds that of low-price services, the rate of increase in prices as measured by Fisher's Ideal will exceed that measured by a Laspeyres index. This implies that a Fisher's Ideal index, by

measuring the actual market basket of services more closely than a Laspeyres index. would attribute some of the growth captured in the "net residual" (i.e., volume and intensity) measured by CRS and others to appear as more rapid price increases. Other things equal, an expenditure decomposition that uses the Fisher's Ideal index as opposed to a Laspeyres index should attribute somewhat less of the growth to volume and intensity.

However, simply using a Fisher's Ideal index does not solve the problem of how to include newly introduced procedures into the index, because it still measures price change between two points in time (as do the Laspeyres and Paasche) and requires that the services at each endpoint must be the same. The index we use solves this problem by measuring price changes over several years as the product of the component annual changes. Because annual price changes are computed independently of one another, the mix of services included in the index can vary between pairs of years. This method, called "chaining," relaxes the constraint of fixed-weight indices that the services included in the index remain constant across all years. The average annual change in prices is computed as the geometric mean of the component indices entered into the chained Fisher's Ideal index. This is analogous to the method for computing the average annual changes in expenditures and beneficiaries discussed above.

We aggregated the 238 Medicare pricing localities (excluding Puerto Rico and the Virgin Islands) into 121 areas representing broad geographic categories. Specifically, we identify sets of localities that represent very large cities, large cities adjacent to very large cities, other large cities, small cities, rural areas and small cities, rural areas, and states which are generally single Medicare pricing areas. This is the same area classification scheme used in our study of geographic border crossing for Medicare physician services (Holahan and Zuckerman, 1991). Exhibit A indicates the cities or the geographic areas that are within each type of area. Very large cities include the ten largest MSAs in terms of population. Since our designation of cities

Exhibit A

Designation of Medicare Payment Localities

VERY LARGE CITIES

San Francisco, Cal metro area
Washington, DC metro area
Miami, Fla
Chicago, Ill
Urban Mass
Detroit, Mich
NYC metro area
Large cities, Penn
Houston, Tex
Los Angeles, Cal

ADJACENT LARGE CITIES

Oakland/Berkeley, Cal
San Bernadino/Riverside, Cal
Fort Lauderdale, Fla
East St. Louis, Ill
Poughkpsie/North NYC suburbs
Ventura, Cal
Anaheim/Santa Ana, Cal

NONADJACENT LARGE CITIES

Birmingham, Ala
New Orleans, La
Sacremento, Cal
Santa Clara/Monterey, Cal
North and North Central Fla
Indiana metro areas
Kansas City metro area
Buffalo, NY
Rochester, NY
San Antonio, Tex
Dallas, Tex
Seattle, Wash
Milwaukee, Wisc
Phoenix, Ariz
Atlanta, Ga
Portland, Ore
San Diego, Cal
Hartford, Conn
New Haven, Conn
St. Paul/Minneapolis, Minn
Tidewater, Va
St. Louis, Mo
Akron/Youngstown, Ohio
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dayton/Springfield, Ohio
Baltimore, MD

SMALL CITIES

Small cities, Ala
Mobile, Ala
Small cities, La
Stockton, Cal
Merced, Cal
Fresno, Cal
Monterey, Cal
Bakersfield, Cal
Small cities, Ill
Small cities, Ind
Iowa City, Iowa
Omaha, Neb
Lexington/Louisville, Ky
N. Central cities, NY
Small cities, Penn
Fort Worth, Tex
Tucson, Ariz
Small cities, Ga
Oklahoma City, Ok
Tulsa, Ok
Santa Barbara, Cal
Stamford, Conn
Richmond, Va
Charleston, Wv

SMALL CITIES/RURAL

Small cities/rural Iowa
Small cities/rural Kan
Small cities/rural Neb
Small cities/rural Ky
Small cities/rural Mass
Small cities/rural Mich
Small cities/rural Minn
Northeast Tex
Southeast Tex
Western Tex
Small cities/rural Wash
Small cities/rural Wisc
Small cities/rural Ore
Small cities/rural Conn
Small cities/rural Va
Small cities/rural Mo
Small cities/rural Ohio
Small cities/rural WV
Small cities/rural MD

RURAL

Rural Ala
Rural La
Northern Rural Cal
Rural Fla
Rural Ill
Rural Ind
Rural NY
Rural Penn
Rural Ariz
Rural Ga
Rural Ok

STATEWIDE

Arkansas
Colorado
Delaware
Montana
New Hampshire
Vermont
North Dakota
South Dakota
New Jersey
Rhode Island
South Carolina
Utah
Alaska
Hawaii
Nevada
New Mexico
Idaho
Tennessee
Wyoming
North Carolina
Mississippi
Maine

jh.3900:3983-3 tl

is constrained by the definition of Medicare localities, in some instances we grouped cities with surrounding areas to approximate an MSA. For example, in San Francisco we have included San Mateo and Marin counties. Washington, D.C. includes adjacent counties in Maryland and Norther Virginia. Large Pennsylvania cities include Pittsburgh, Philadelphia and Scranton.

Large cities adjacent to very large cities is a group of cities with more than 100,000 Medicare enrollees contiguous to one of the ten largest MSAs. For example, Oakland/Berkeley is adjacent to San Francisco and San Bernadino/Riverside is adjacent to Los Angeles. Non-adjacent large cities are similarly sized cities, in terms of Medicare enrollment, that are not contiguous to a very large MSA. These include Birmingham, Alabama; New Orleans, Louisiana; Baltimore, Maryland; Dallas, Texas, and others.

Small cities include MSAs with less than 100,000 Medicare enrollees. These include Mobile, Alabama; Stockton and Bakersfield, California; Iowa City, Iowa; Tucson, Arizona and Tulsa, Oklahoma. Small cities and rural areas includes both small MSAs and rural areas where it was impossible because of the Medicare locality structure to separate the small city from the rural area. Rural areas could be defined in 11 states and are entirely rural, in that they contain no counties that are part of an MSA. Most of the 22 states that could not be subdivided are small states that are state-wide pricing localities, but some are not, e.g., North Carolina and New Jersey.

RESULTS

Table 1 shows the results of decomposing the rate of growth in Medicare physician expenditures by type of service.[2] For all services, the average annual growth in expenditures between 1985 and 1989 was 12.1 percent. Only 10 percent (1.1 percentage points) of this growth was due to increases in enrollees.[3] An additional 30 percent (3.5 percentage points) of expenditure growth was due to increases in Medicare's prices. The remaining 60 percent (7.1 percentage points) of the growth was due to increases in the volume and intensity of services.

Before turning to the results by type of service, it is useful to consider the impact of the Fisher's Ideal index on our results when compared to the CRS study. To do this we need to restrict our analysis to the years 1985 through 1987 because that is the period covered by CRS. Based on our approach, the results (not shown) indicate that expenditures grew by 15 percent and volume and intensity grew by a little more than 7 percent annually during 1985-1987. Despite reporting comparable expenditure growth over the 1985-1987 period, CRS reports an annual rate

---

2. Type of service is defined on the basis of a new procedure classification system for Medicare services developed as part of this project by the Urban Institute (see Berenson and Holahan 1990). This type-of-service classification system divides Medicare services into 4 major categories and 20 subcategories. The first major group is evaluation and management services; it includes office visits, hospital visits, emergency room services, home and nursing home visits, consultations, and specialist evaluation and management services. Specialist evaluation and management services includes a range of evaluation and management services provided by ophthalmologists, psychiatrists, pathologists, allergists, and other subspecialties.

The second major group is procedures. This includes major procedures, subdivided into cardiovascular, orthopedic, and other, ambulatory procedures which, subdivided into eye and other, and minor procedures,including endoscopies and oncology procedures. Imaging is the third major group and is divided into standard imaging (routine x-rays and nuclear medicine), advanced imaging (CT scans and magnetic resonance imaging), sonographic imaging, and imaging/procedures (largely cardiac catheterization). The final major group is tests, divided into laboratory and other tests. Other tests is dominated by a wide range of cardiovascular tests.

3. For the decompositions of expenditures by type of service and specialty, we use the same national average annual change in enrollees for all subcategories. Therefore, to simplify Tables 1 and 2, we omit the "Enrollee" column that would have an entry of "1.1 percent" in each row.

Table 1

Decomposition of Growth in Medicare Allowed Charges,
1985-1989, by Type of Service

Type of Service	Average Annual Growth in: Expenditures	Prices	Volume & Intensity
ALL SERVICES	12.1%	3.5%	7.1%
Standard Imaging	10.3	3.7	5.1
Advanced Imaging	23.7	3.3	18.4
Sonography	20.8	2.7	16.3
Imaging/Procedures	16.5	4.9	9.8
Office Visits	11.0	5.1	4.4
Hospital Visits	7.5	4.8	1.5
Emergency Room Services	21.9	5.3	14.5
Non-hospital, Non-specialist Visits	9.0	5.0	2.6
Specialist Evaluation & Management Services	19.9	5.2	12.7
Consultations	10.2	3.9	4.8
Major Procedures-Other	6.4	2.4	2.7
Major Procedures-Cardiovascular	12.6	4.1	6.9
Major Procedures-Orthopedic	8.1	2.6	4.1
Ambulatory Procedures-Other	10.3	3.3	5.6
Ambulatory Procedures-Eye	13.3	0.2	11.8
Minor Procedures	16.8	3.7	11.4
Oncology Services	15.9	9.4	4.7
Endoscopy Procedures	16.6	3.4	11.4
Laboratory Tests	20.8	0.7	18.6
Other Tests	11.8	5.6	4.7

Source: 1985-1989 BMAD Procedure File and 1985-1989 Beneficiary Denominator File

Note: The national average growth in enrollees not in risk HMOs (1.1 percent) is used in the decomposition of expenditures in each type of service and specialty (Table 3).

Readers should note that the growth in expenditures ($\%\Delta EX$) is not equal to the sum of the growth in prices ($\%\Delta P$), enrollees ($\%\Delta EN$), and volume and intensity ($\%\Delta VI$). As shown in equation 2, expenditures equals the product of prices, enrollees, and volume and intensity. Therefore, algebraically the growth rates can be combined as follows: $(1+\%\Delta EX) = (1+\%\Delta P) = (1+\%\Delta EN) = (1+\%\Delta VI)$.

of increase in volume and intensity of almost 8 percent. As expected, CRS reports price increase that are 1 percentage point lower than measured here due to differences in the forms of indexes used. One reason that the volume and intensity results are so similar is that CRS reported faster enrollee growth than we measured from the HCFA Denominator File. This suggests that the Fisher's Ideal price index is capturing a portion of the growth in volume and intensity that would be detected with a fixed-weight price index.

Type of Service

Returning to the type of service results, Table 1 illustrates that differences in both the rate of increase in volume and intensity and its relative importance in explaining expenditure growth varied dramatically across service categories. Expenditures for advanced imaging services (largely, CAT scans and MRIs) grew at the fastest annual rate -- 23.7 percent during the study period, 80 percent of which was due to increases in volume and intensity. However, the physician services most affected by volume and intensity increases were laboratory tests. Only 10 percent of the 20.8 percent average annual growth in expenditures was due to enrollees and prices. The remaining 90 percent of the growth in lab tests professional charges was related to volume and intensity. Other categories of services for which expenditures grew rapidly because of above average volume and intensity increases were sonography, imaging involving a procedure (e.g., coronary angiography), emergency room services, specialist evaluation and management, ambulatory eye procedures (e.g., cataract surgery), minor procedures, and endoscopies (e.g., colonoscopies and arthroscopies).

Volume and intensity grew more slowly for services that might be considered older and well-established. These included standard imaging (basic X-rays and mammographies), office and hospital visits, consultations, major inpatient procedures, and ambulatory procedures not

related to the eye. Although volume and intensity growth for these services is relatively lower than newer services, because it is never negative it still contributes to the growth in expenditures. Hospital visits provide a good example of services with relatively lower volume and intensity growth. Despite having above average increases in prices, expenditures for hospital visits grew by only 7.5 percent annually. This outcome is due largely to annual volume and intensity growth of only 1.5 percent. However, even for hospital visits, volume and intensity still accounted for 20 percent of the average annual rate of increase in outlays.

Annual fluctuation in volume and intensity: type of service. As presently structured, Volume Performance Standards are based, in part, on a five-year average rate of increase in volume and intensity. This is precisely what is reflected in the last column of Table 1 for each service. However, when decisions regarding fee updates are made, the MVPS policy will rely on the rate of change in expenditures in a single year. To the extent that volume and intensity growth fluctuates widely from year to year, this policy could, over time, result in a series of fee adjustments that are the result of unexplained fluctuations that tend to cancel out each other. Table 2 explores this issue by presenting annual growth rates for volume and intensity. The data suggest that, across all services, volume and intensity growth is reasonably steady over time. Volume and intensity growth only deviates from the five-year average of 7.1 percent by more than one percentage point in a single year (1986-87). This suggests that a national VPS is not likely to often reward or penalize physicians as a result of year-to-year variations in volume and intensity growth.

However, this conclusion would not hold if the MVPS policy were based on individual types of services analyzed here. There are service categories in which growth during one or more years differs markedly from the five-year average growth rate. Growth rates either fluctuate -- as in the case of most service categories -- or trend downward. For example,

Table 2

Annual Growth in Volume and Intensity
of Medicare Physician Services
1985-1989, by Type of Service

Type of Service	1985-86	1986-87	1987-88	1988-89	Average Annual
ALL SERVICES	6.3%	8.3%	7.3%	6.5%	7.1%
Standard Imaging	5.0	4.8	6.1	4.6	5.1
Advanced Imaging	25.4	16.9	18.5	13.3	18.4
Sonography	23.4	15.4	23.8	3.6	16.3
Imaging/Procedures	9.8	12.0	9.2	8.2	9.8
Office Visits	2.3	7.4	4.2	3.7	4.4
Hospital Visits	-4.5	7.5	6.0	3.3	1.5
Emergency Room Services	24.9	12.2	7.6	14.0	14.5
Non-hospital, Non-specialist Visits	8.6	3.5	2.3	-3.6	2.6
Specialist Evaluation & Management Services	16.6	15.0	10.7	8.6	12.7
Consultations	7.1	10.1	3.0	-0.8	4.8
Major Procedures-Other	2.3	4.5	0.9	3.3	2.7
Major Procedures-Cardiovascular	8.6	6.5	4.6	8.0	6.9
Major Procedures-Orthopedic	2.3	4.4	5.5	4.4	4.1
Ambulatory Procedures-Other	8.5	5.6	3.4	5.2	5.6
Ambulatory Procedures-Eye	20.9	15.0	10.3	2.0	11.8
Minor Procedures	13.1	9.5	11.3	11.6	11.4
Oncology Services	5.9	7.5	2.0	3.5	4.7
Endoscopy Procedures	14.1	10.6	11.1	10.0	11.4
Laboratory Tests	19.0	3.8	31.4	21.6	18.6
Other Tests	12.4	6.9	4.5	-4.2	4.7

Source: 1985-1989 BMAD Procedure File and 1985-1989 Beneficiary Denominator File

although volume and intensity of ambulatory eye procedures grew by 11.8 percent, on average, growth rates declined from 20.9 percent between 1985 and 1986 to 2 percent during the last year covered. Similar downward trends were also observed among advanced imaging and sonography. These could reflect a levelling-off after a surge in technological diffusion. A slowdown after a technologically-driven surge could also explain the falling volume and intensity growth for specialist evaluation and management, composed of services provided by ophthalmologists, psychiatrists, and surgical pathologists. The leveling off in the volume and intensity of non-hospital, non-specialist visits is not easily explained because this category is largely composed of nursing home and home visits that might be expected to be growing as the population ages.

Among the categories where volume and intensity growth fluctuates, the extent of fluctuation varies considerably. In categories like standard imaging and imaging with a procedure, year-to-year variation is almost negligible. In most of the visit, consultation, and procedure categories, variations in volume and intensity growth are small but not trivial relative to the five-year average. There are other instances in which volume and intensity growth differences are quite large over time. For example, among emergency room services, annual changes in volume and intensity ranged from 7.6 to 24.9 percent around a mean of 14.5 percent. This variety of patterns of volume and intensity growth highlight a key area of potential problems in developing a MVPS policy based on types of services.

Specialty

A specialty-specific VPS policy may be viewed as an alternative to one based on type of service. We present growth in Medicare allowed charges on a specialty-by-specialty basis in Tables 3 and 4. Since each specialty provides services from several categories, it is not surprising to find that the range of growth rates in expenditures, prices and volume and intensity

Table 3

Decomposition of Growth in Medicare Allowed Charges, 1985-1989, by Specialty

Specialty	Average Annual Growth in: Expenditures	Prices	Volume & Intensity
ALL SERVICES	12.1%	3.5%	7.1%
Medical			
General/Family Practice	8.4	4.4	2.6
Internal Medicine	9.1	4.4	3.3
Cardiovascular Disease	20.2	4.5	13.8
Gastroenterology	21.3	3.7	15.6
Psychiatry	15.0	4.8	8.5
Other Medical	15.3	4.4	9.2
Surgical			
General Surgery	7.1	3.3	2.5
Orthopedic Surgery	10.2	3.1	5.7
Ophthalmology	12.4	1.3	9.7
Thoracic Surgery	12.4	3.9	7.0
Urology	9.9	3.0	5.5
Dermatology	14.4	3.8	9.0
Other Surgical Specialty	11.1	3.3	6.4
Other			
Radiology	14.1	4.3	8.2
Pathology/Laboratory	20.9	1.9	17.3
Multi-Specialty Group Practice	8.2	3.8	3.0
Other Non-Physician	16.5	2.1	12.9

Source: 1985-1989 BMAD Procedure File and 1985-1989 Beneficiary Denominator File

Note: See note on Table 1.

Table 4

Relationship Between Changes in Prices (P) and Volume and Intensity (VI) for Specialties Most Affected by OBRA 1987 Overvalued Procedure Payment Reductions

Specialty	1985-86		1986-87		1987-88		1988-89	
	P	VI	P	VI	P	VI	P	VI
Gastroenterology	4.5%	16.3%	8.5%	17.0%	-0.6%	14.0%	2.8%	15.2%
Ophthalmology	2.0	16.8	3.7	12.3	-2.0	7.9	1.8	2.2
Orthopedics	3.9	4.0	6.2	6.6	0.1	5.8	2.3	6.3
Thoracic Surgery	4.6	8.3	8.8	4.5	1.2	6.4	1.1	8.9
Urology	3.4	4.1	6.4	7.8	0.0	3.4	2.3	6.8

Source: 1985-1989 BMAD Procedure File and 1985-1989 Beneficiary Denominator File

is somewhat smaller across specialties than across types of services. However, it is still true that differences in expenditure growth are largely related to differences in volume and intensity. Expenditure growth for the fastest growing specialty -- gastroenterology -- exceeds that for the slowest growth specialty -- general surgery -- by an annual average of about 14 percentage points, even though prices were growing at about the same rate. In fact, three-quarters of the growth in spending on gastroenterologists during this period was due to increases in volume and intensity. Other specialties in which volume and intensity growth was above average during this period are psychiatry, ophthalmology, dermatology, radiology, pathology/laboratory, other medical specialties (e.g., neurologists and allergists), and other non-physicians (e.g., chiropractors, optometrists, podiatrists, oral surgeons, and portable x-ray suppliers). General and family practitioners, internists, general and orthopedic surgeons, and urologists all had below average rates of growth in volume and intensity but could still have fee increases reduced under a national VPS policy.

Two specialties -- ophthalmology and pathologists -- provide good examples of why price control policies alone, such as those of the 1984-1987 fee freezes, may not result in spending controls. Largely because of the limits placed on cataract fees, ophthalmologists Medicare prices grew by only 1.3 percent annually between 1985 and 1989, less than forty percent of the average for all specialties. However, spending for ophthalmologists' services grew at a rate slightly above the national average as a result of above average volume and intensity growth. This outcome is even more dramatic among pathologists and labs. Their prices grew by only 0.9 percent annually, while spending grew by a rate of 20.9 percent. This rapid increase in spending is due to the fact that volume and intensity of physicians' professional pathology/laboratory services increased at 17.3 percent per year, over twice the national average. Although this study has not established a causal link between the slower rate of price growth and the rapid growth in

volume and intensity, these results do suggest that price controls alone do not necessarily cause spending to slow.

To further emphasize the complexity of the linkage between prices and volume and intensity, we consider the five specialties most strongly affected by the April 1988 overvalued procedure fee reductions. Focusing on changes during the year the policy was implemented -- 1987-88 -- Table 4 shows that the two specialties whose fees were cut the most (ophthalmologists and gastroenterologists) had the greatest increase in volume and intensity. This suggests that there may have been some mechanism through which these physicians were able to offset a portion of the fee cut by expanding service volume and intensity. This is essentially the result reported by Hogan (1991).

However, examining the data across years presents a different picture. Despite all five specialties experiencing a slowdown in prices in 1987-88, except for thoracic surgeons, volume and intensity grew more slowly in that year than it had in the preceding year. For ophthalmologists, 1987-88 represented part of what appears to be a steady decline in volume and intensity growth, while for gastroenterologists that year was not very different than other years in which volume and intensity growth was high. In the other instances, there was nothing particularly different about volume and intensity growth during 1987-88 to suggest a relationship to the price reductions. While there are other factors that could be used to explain volume and intensity growth, these descriptive data suggest that both differences across specialties as well differences across time within a specialty may be relevant to consider.

Annual fluctuation in volume and intensity: specialty. Table 5 addresses the question of whether a specialty-based approach to MVPS would lessen the problems associated with annual fluctuations in volume and intensity relative to a type-of-service approach. Our analysis suggests that annual fluctuations may be less of an issue here than for a type-of-service MVPS.

Table 5

Annual Growth in Volume and Intensity
of Medicare Physician Services
1985-1989, by Specialty

Type of Specialty	1985-86	1986-87	1987-88	1988-89	Average Annual
ALL SPECIALTIES	6.3%	8.3%	7.3%	6.5%	7.1%
Medical					
General/Family Practice	-1.1	4.0	3.1	4.6	2.6
Internal Medicine	-0.2	6.2	2.5	4.8	3.3
Cardiovascular Disease	16.0	14.9	12.5	11.7	13.8
Gastroenterology	16.3	17.0	14.0	15.2	15.6
Psychiatry	6.8	9.7	4.7	12.9	8.5
Other Medical	6.7	10.8	8.1	8.8	9.2
Surgical					
General Surgery	2.3	3.2	0.8	3.7	2.5
Orthopedic Surgery	4.0	6.6	5.8	6.3	5.7
Ophthalmology	16.8	12.3	7.9	2.2	9.7
Thoracic Surgery	8.3	4.5	6.4	8.9	7.0
Urology	4.1	7.8	3.4	6.8	5.5
Dermatology	10.2	9.9	6.0	9.9	9.0
Other Surgical Specialty	5.8	5.4	5.8	8.4	6.4
Other					
Radiology	6.2	7.5	6.5	12.7	8.2
Pathology/Laboratory	17.3	9.9	24.0	18.7	17.3
Multi-Specialty Group Practice	2.9	5.4	17.7	-11.9	3.0
Other Non-Physician	9.0	19.8	13.8	9.2	12.9

Source: 1985-1989 BMAD Procedure File and 1985-1989 Beneficiary Denominator File

While there are specialties where annual volume and intensity changes do not remain fairly close to the five-year average (e.g., psychiatry, ophthalmology, and radiology), the variability does not seem to be as large as that associated with types of services. For example, there are no specialties where the year-to-year variation in volume and intensity growth is as large as that observed among emergency room services, sonography, or laboratory tests. This suggests that a MVPS policy that had separate specialty standards might have fewer problems of this type than one based exclusively on type of service performance standards.

Geographic Areas

The final expenditure decompositions considered relates to a geographically-based subnational MVPS policy. Expenditures are decomposed for each of the seven categories of areas. Data in Table 6 show that differences in expenditure and volume and intensity growth across types of areas are much smaller than is observed across specialties and types of services. Most of the geographic differences in Table 6 relate to differences in the growth of prices and enrollees. For the categories of areas shown, volume and intensity growth during this five-year period ranged from about 1 percentage point above (large cities -- nonadjacent) to less than one-quarter point below the national average. However, there are area-to-area differences that the data in Table 6 do not fully convey -- that is, the within category differences are larger than the across category differences in volume and intensity growth.

To provide a clearer understanding of the degree of geographic variation in volume and intensity growth, Table 7 presents area-level statistics for each of the 121 areas considered in this study. Over the five years covered by this study, volume and intensity growth varied widely within types of areas. For example, among the 10 very large cities identified in these data, volume and intensity growth ranged from a low of 0.6 percent annually in Chicago to a high of

Table 6

Decomposition of Growth in Medicare Allowed Charges, 1985–1989, by Area Type

Area Type	Average Annual Change in: Expenditures	Price	Enrollees	Volume and Intensity
NATIONAL	12.1%	3.5%	1.1%	7.1%
Very Large Cities	10.2	3.2	-0.3	7.2
Large Cities-Adjacent	11.1	2.8	0.6	7.5
Large Cities-Nonadjacent	13.5	3.4	1.5	8.1
Small Cities	13.1	4.0	1.8	6.9
Small Cities/Rural	12.0	2.9	1.3	7.5
Rural	14.3	4.3	1.9	7.5
Statewide	12.7	3.2	1.6	6.9

Source: 1985–1989 BMAD Procedure File and 1985–1989 Beneficiary Denominator File

Note: See note on Table 1.

Table 7

Decomposition of Growth in Medicare Allowed Charges, 1985-1989, by Area

Area	Average Annual Change in: Expenditures	Price	Enrollees	Volume and Intensity
Very Large Cities	**10.2%**	**3.2%**	**-0.3%**	**7.1%**
San Francisco/San Mateo/Marin, CA	6.2	1.8	-0.8%	5.1
D.C. & MD/VA Suburbs (Area Wide)	12.0	3.6	1.95	6.1
Miami, FL	11.8	4.4	0.4	6.7
Chicago, IL	10.7	10.3	-0.2	0.6
Urban Massachusetts	9.3	3.8	-0.5	5.8
Detroit, MI	10.6	-2.5	1.2	12.1
New York City Metro	8.2	2.0	-0.7	6.8
Large Cities, Pennsylvania	12.8	4.2	0.6	7.6
Houston, TX	17.1	1.8	3.4	11.3
Los Angeles, CA	8.3	2.0	-3.4	9.8
Large Cities - Adjacent	**11.1**	**2.8**	**0.6**	**7.5**
Oakland/Berkeley, CA	8.8	1.6	1.7	5.3
San Bernadino/Riverside, CA	5.0	1.7	-2.5	5.9
Fort Lauderdale, FL	14.9	4.1	2.4	7.8
East St. Louis, IL	12.9	10.2	1.1	1.4
Poughkpsie/N NYC Suburbs	7.9	3.3	0.3	4.1
Ventura, CA	11.2	0.5	0.3	10.4
Anaheim/Santa Ana, CA	8.9	0.2	-1.8	10.7
Large Cities - Non Adjacent	**13.5**	**3.4**	**1.5**	**8.1**
Birmingham, AL	12.9	5.5	1.1	5.9
New Orleans, LA	13.4	3.3	2.3	7.3
Sacramento, CA	13.0	1.2	3.6	7.9
Santa Clara/Monterey, CA	8.1	1.5	2.1	4.3
N/NC Florida Cities	16.4	3.6	2.7	9.3
Metropolitan Indiana	14.9	3.8	1.9	8.6
Baltimore, MD	13.2	-1.2	1.6	12.9
Kansas City (Area Wide)	12.4	5.7	0.6	5.7
Buffalo, NY	12.3	3.8	0.4	7.7
Rochester, NY	6.3	3.4	-1.9	4.7
San Antonio, TX	15.5	1.4	2.7	11.0
Dallas, TX	15.1	1.2	2.2	11.3
Seattle, WA	12.0	4.5	1.8	5.3
Milwaukee, WI	11.3	2.2	1.0	7.9
Phoenix, AZ	10.8	4.2	1.8	4.5
Portland, OR	2.7	2.3	-6.3	7.1
San Diego, CA	10.4	1.0	-0.9	10.3
Hartford, CT	14.8	3.0	1.1	10.3
New Haven, CT	13.8	3.3	-0.1	10.2
St. Paul/Minneapolis, MN	11.8	5.6	-0.1	6.0
Tidewater, VA	13.4	3.4	3.5	5.9

sz.3983:05 tab 7

Area	Average Annual Change in: Expenditures	Price	Enrollees	Volume and Intensity
St. Louis, MO	13.8	2.6	1.1	9.6
Atlanta, GA	13.9	6.1	2.5	4.7
Akron/Youngstown, OH	15.1	3.5	2.1	9.0
Cincinnati, OH	15.8	4.1	3.0	8.0
Cleveland, OH	14.4	4.0	0.9	9.0
Columbus, OH	13.8	6.6	1.9	4.7
Dayton/Springfield, OH	15.6	3.6	2.2	9.2
Small Cities	13.1	4.0	1.8	6.9
Sm Cities, Al	16.2	4.1	1.9	9.5
Mobile, Al	15.2	3.7	2.5	8.4
Sm Cities, LA	15.8	2.6	3.0	9.7
Stockton, CA	12.6	2.4	2.9	6.9
Merced, CA	10.0	2.0	2.8	4.9
Fresno, CA	10.5	1.7	2.8	5.7
Monterey, CA	7.5	1.7	1.3	4.4
Bakersfield, CA	11.8	2.4	2.8	6.2
Sm Cities, IL	11.4	9.0	1.2	1.0
Sm Cities, Indiana	14.4	3.2	1.6	9.1
Iowa City, Iowa	13.6	5.7	1.0	6.4
Omaha, Nebraska	6.9	4.6	0.3	1.9
Lexington/Louisville, KY	17.3	3.5	1.7	11.4
N. Central Cities, NY	11.9	4.2	0.6	6.7
Small Cities, Pennsylvania	13.0	4.3	1.4	6.9
Fort Worth, TX	14.6	2.3	2.7	9.1
Tucson, AZ	14.8	5.1	3.7	5.4
Oklahoma City, OK	13.6	2.4	2.3	8.5
Tulsa, OK	13.8	3.4	2.3	7.6
Santa Barbara, CA	11.6	0.5	2.9	8.0
Stamford, CT	15.4	2.9	-0.8	13.0
Richmond, VA	10.6	3.0	1.9	5.3
Sm Cities, GA	13.6	6.5	2.3	4.3
Charleston, WV	15.3	5.3	1.4	8.0
Small Cities/Rural	12.0	2.9	1.3	7.5
Sm Cities/Rural Iowa	11.2	4.1	0.5	6.2
Sm Cities/Rural Nebraska	7.8	5.0	0.2	2.5
Sm Cities/Rural Kansas	2.5	6.6	0.2	-4.1
Sm Cities/Rural KY	14.6	1.7	1.3	11.2
Sm Cities/Rural Maryland	14.5	-1.5	2.3	13.6
Sm Cities/Rural Massachusetts	10.6	3.9	0.3	6.2
Sm Cities/Rural Michigan	12.5	-0.4	1.6	11.2
Sm Cities/Rural Minnesota	11.1	1.9	0.6	8.4
Northeast Texas	13.8	1.8	1.3	10.3
Southeast Texas	16.3	2.2	2.6	11.0
Western Texas	13.6	1.7	1.9	9.6
Sm Cities/Rural WA	12.0	4.4	2.0	5.2
Sm Cities/Rural Wisconsin	8.9	2.0	1.1	5.6
Sm Cities/Rural OR	10.3	2.5	1.2	6.4

Area	Average Annual Change in: Expenditures	Price	Enrollees	Volume and Intensity
Sm Cities/Rural CT	15.1	4.0	1.5	9.0
Sm Cities/Rural VA	10.9	3.4	1.9	5.2
Sm Cities/Rural MO	13.1	2.9	0.9	9.0
Sm Cities/Rural OH	13.5	4.9	1.3	6.8
Sm Cities/Rural WV	13.6	5.9	1.0	6.3
Rural	14.3	4.3	1.9	7.5
Rural AL	12.5	5.3	1.3	5.5
Rural LA	18.0	3.1	2.3	11.8
Northern Rural California	10.7	1.9	2.8	5.7
Rural Florida	18.2	4.3	4.9	8.1
Rural IL	10.9	5.7	0.8	4.1
Rural Indiana	15.4	3.6	1.2	10.1
Rural NY	10.8	4.4	0.8	5.3
Rural Pennsylvania	13.9	4.8	1.5	7.1
Rural AZ	21.3	4.8	4.1	11.3
Rural OK	12.9	2.4	0.5	9.6
Rural GA	14.1	6.1	1.7	5.7
Statewide	12.7	3.2	1.6	6.9
Arkansas (Statewide)	11.7	2.4	1.1	7.9
Colorado (Statewide)	8.5	-0.6	0.4	8.7
Delaware (Statewide)	32.0	2.7	2.7	25.2
Montana (Statewide)	14.2	1.6	2.0	10.2
New Hampshire (Statewide)	12.8	3.3	1.4	7.6
Vermont (Statewide)	12.4	4.8	1.1	6.1
North Dakota (Statewide)	9.4	1.9	1.0	6.3
South Dakota (Statewide)	11.9	2.4	1.0	8.1
* Rhode Island (Statewide)	8.7	5.4	-0.1	3.2
South Carolina (Statewide)	15.7	2.4	3.0	9.7
Utah (Statewide)	15.4	2.0	3.0	9.8
Alaska (Statewide)	15.6	3.2	7.1	4.6
Hawaii (Statewide)	5.0	2.1	-3.1	6.1
Nevada (Statewide)	16.1	4.8	4.4	6.0
Idaho (Statewide)	10.0	2.7	2.2	4.9
New Mexico (Statewide)	12.6	3.5	1.9	6.8
Tennessee (Statewide)	14.9	3.7	1.7	8.9
Wyoming (Statewide)	12.5	2.8	2.7	6.6
Mississippi (Statewide)	11.3	3.2	1.1	6.7
New Jersey (Statewide)	13.0	4.4	0.8	7.3
North Carolina (Statewide)	16.5	4.8	2.6	8.3
Maine (Statewide)	12.6	4.9	1.3	6.0

Source: 1985-1989 BMAD Procedure File and 1985-1989 Beneficiary Denominator File

* Since there was no 1989 BMAD data for Rhode Island, this entry relates to the years 1985-1988.

Note: See note on Table 1.

sz.3983:05 tab 7

12.1 percent in Detroit. Similarly, volume and intensity increases in small cities varied from 1.0 percent annually in the small cities of Illinois to 13 percent in Stamford, CT. This extent of variation suggests that physicians in some areas of the country may be unintentionally rewarded or penalized with fee updates that are tied to a national VPS policy.

The data in Table 6 are also noteworthy because of what they imply about the degree to which differential geographic rates of growth might smooth some of the extensive cross-sectional variation in service provision that exists. In 1988, expenditures on providers in the very large cities category (per enrollee resident) were almost three times that in rural areas (Holahan and Zuckerman, 1991). Even though a great deal of this difference is reduced as a result of border crossing, it remains that Medicare spends about 50 percent more on beneficiaries in very large cities than in rural areas. Price indices developed by Zuckerman and Holahan (1991) show that about one-half of this difference may be related to price variation. The remainder would then be due to volume and intensity differentials. Given that rural areas exhibited volume and intensity growth that exceeded the very large cities by only 0.42 percent annually, it could take several decades to close the cross-sectional gap. In fact, a uniform MVPS policy is implicitly providing an incentive to keep geographic differentials in volume and intensity growth rates small and, perhaps inadvertently, could be perpetuating differential use rates.

CONCLUSION

This study shows that volume and intensity growth was the major cause of the large annual increases in Medicare physician spending between 1985 and 1989. It also shows that the relative contribution of volume and intensity to explaining expenditure growth was not uniform across specialties, types of services, or geographic areas. This suggests that the present VPS policy that only includes separate targets for surgical and non-surgical services may constrain fees

for many services whose volume and intensity growth is well below average and not a major cause of cost inflation. Conversely, current policy could result in fee increases for services with high rates of volume and intensity growth because those services benefit from low growth in other areas.

In fact, any disaggregated VPS policy that continued to apply a uniform target to groups of services with fundamentally different rates of growth would have this problem. Although there may be sound arguments for fundamentally different growth rates for almost every service, such an approach is impractical. Some grouping of services -- either by type of service, by specialty, or by geographic area -- is necessary in order to have a workable VPS policy.

REFERENCES

Berenson, Robert and John Holahan. 1990. "Using A New Type-of-Service Classification System to Examine the Growth in Medicare Physician Expenditures, 1985-1988." Urban Institute Working Paper 3983-01, December (Revised).

Barer, M., R.G. Evans, and R.J. Labelle. 1988. "Fee Controls as Cost Control: Tales from the Frozen North." Milbank Memorial Fund Quarterly 66:1-64.

Cahill, Kenneth R., James Reuter, Kathryn Langwell, and Richard Shin. 1989. "Prospective Budgeting for Medicare's Physician Service." CRS Report for Congress, 89-600 EPW. Congressional Research Service.

Hogan, Christopher. 1991. "Volume Response to OBRA87 Overvalued Procedure Fee Cuts." Draft paper. Physician Payment Review Commission.

Holahan, John and Robert Berenson. 1991. "The Growth in Medicare Physician Services by Specialty: Implications for Volume Performance Standards." Urban Institute Working Paper 3983-02, February.

Holahan, John and Stephen Zuckerman. 1991. "Geographic Border Crossing: Implications for Volume Performance Standards." Urban Institute Working Paper 3983-03, April.

Joel Popkin and Company. 1990. "Price Indexes for Use in Calculating Changes in Volumes of Physicians' Services Through Time and Across Geographical Areas." Prepared for The Urban Institute under HCFA Grant No. 17-C-00473, November 20.

Pope, G., W. P. Welch, S. Zuckerman, and M. Henderson. 1989. "Cost of Practice and Geographic Variation in Fees." Health Affairs 8 (3): 117-128.

Zuckerman, Stephen and John Holahan. 1991. "Measuring Prices of Medicare Physician Services." Urban Institute Working Paper 3983-04, July.

CMS LIBRARY
3 8095 00012780 9